IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: OIKAWA, et al.
Serial No.: No. 10/804,244
Filed: March 18, 2004
For: SHAPE MEMORY ALLOY AND METHOD FOR PRODUCING SAME
Art Unit: 1742
Examiner: GEORGE P. WYSZOMIERSKI

DECLARATION UNDER 37 CFR § 1.132

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

I, Katsunari OIKAWA, a citizen of Japan, declare that:

(1) I reside at 1-3-4-503 Mikamine, Taihaku-ku, Sendai, 982-0826, Japan.

(2) I graduated from Tohoku University, Faculty of Engineering in 1991, specializing in Materials Science.

(3) I joined the Tohoku National Industrial Research Institute (TNIRI) in 1996, as a researcher in Materials Science. The TNIRI became the national Institute of Advanced Industrial Science and Technology (AIST), Tohoku Center in 2000 by reorganization. I changed my job to Tohoku University in 2005.

(4) I am now associate Professor of Tohoku University since 2005.

(5) I understand the present invention and the prosecution history of the above-identified application.

(6) I have reviewed the Office Action mailed April 12, 2007 and the references cited by the Examiner.

(7) I conducted the following experiments to obtain the tensile strength of 260 MPa under "Comparative Example 2 in Table 1' continued," which describes the Oikawa's alloy "G" appeared in the cited reference of Oikawa et al. Applied Physics Letters, vol. 79, no. 20, set forth in the Response to the Office Action.

Experiments

1. Starting Materials

The Oikawa's alloy "G", Ni_{33}-Co_{40}-Al_{27} alloy (by atomic%), was prepared by melting pure nickel (99.9%), cobalt (99.9%) and aluminum (99.7%) in an induction furnace under an argon atmosphere.

2. Preparation of Test Samples

After melting, the alloy was cast into a steel mold. The obtained ingot was hot rolled at 1573K to a thickness of about 2mm. The hot rolled plate was cut into a ribbon of 2mm wide and 20mm long. The ribbon was heat-treated at 1350℃ for 2 minutes in the first heat treatment step and heated at 1300℃ for 15 minutes in the second heat treatment step followed by quenching in ice water. The cut sheet was wet-polished to prepare a 1.2-mm-thick test sample.

3. Measurements (with apparatuses used)

The tensile strength of the sample was measured at room temperature at a crosshead speed of 0.5mm/minute.

4. Results and Discussion

It was found that the γ-phase area ratio at β-phase grain boundaries of the Ni_{33}-Co_{40}-Al_{27} alloy is 32% and that the tensile strength of the Ni_{33}-Co_{40}-Al_{27} alloy is 260 MPa. This poor mechanical property might be due to the low γ-phase area ratio at β-phase grain boundaries.

5. Conclusion

The γ'-phase area ratio at β-phase grain boundaries of the Ni_{33}-Co_{40}-Al_{27} alloy is 32%.

The tensile strength of the Ni_{33}-Co_{40}-Al_{27} alloy is 260 MPa.

8) I declare further that all statements made herein on personal knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated September 27, 2007

K. Oikawa

Katsunari OIKAWA